SUMMARY
OF THE
IMPROVEMENTS AND DISCOVERIES
IN THE
MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Death from an impermeable covering of the Skin.*—The importance of the function performed by the skin, is perhaps scarcely sufficiently appreciated. The experiments of Becquerel and Breschet show that animals whose skins are covered with an impenetrable coating, speedily die. (See Number of this Journal for Oct. 1842, p. 445.) Any cause which interrupts the functions of a considerable portion of the cutaneous covering of the body, is productive of serious consequences. Thus extensive blisters, especially in children, are productive of very ill effects. Burns, also, are, as a general rule, serious in proportion to their extent. The late Dr. Physick used to mention in his lectures, a case in which a child fell into a tub of hot water, in which the mother was washing, with a fatal result.

M. Mojon, at a late meeting of the Medical Society of Emulation of Paris, stated that a child whose body had been covered with gold leaf, for a figure in a procession, died the same night.

2. *On the Function of the Red Corpuscles of the Blood, and on the Process of Arterialization.* By Geo. Owen Rees, M. D.—(*Proceedings Royal Soc.*, June 3d, 1847.) The author states that he was first led to the new theory he has formed for the explanation of the chemical phenomena of respiration, and more especially of the change in the colour of the blood which occurs in that process, by having observed that a garlic odour, similar to that evolved from phosphorus, was produced by agitating in distilled water, the clot obtained from some specimens of venous blood. His attention was consequently directed to the investigation of the state in which the phosphorus exists in the blood; and the result of this investigation was the theory, of which the following is a succinct outline.

The venous corpuscles are known to contain fat in combination with phosphorus. This compound ingredient of the corpuscles, on coming into contact with atmospheric oxygen during the respiratory act, is consumed, and combining with that oxygen, forms the carbonic acid and water which are expired, and also phosphoric acid, which, uniting with the alkali of the liquor sanguinis, forms a tribasic phosphate of soda. This salt, like many others, acts upon hæmatosine in such a manner as to produce the well-known bright arterial tint.

The analyses which the author has performed, in order to test the correctness of this theory, were made upon the blood, both of the veins and of the arteries, of the same animal; and also upon separated portions of the same venous blood; one of which portions had been artificially arterialized by having been brought into contact with air, while the other portion had not been so exposed. These comparative experiments showed that arterial blood, both when obtained from the vessels, and when artificially produced, contains in its serum a larger proportion of tribasic phosphate of soda than that obtained from the veins. The venous corpuscles, as they are contained in the clot, yield a fatty matter combined with phosphorus; while those from arterial blood yield a fat, the ashes of which manifest an alkaline reaction. Thus the venous corpuscles are shown to be acted upon both by respiration, and by the artificial arterialization of the blood, in such a manner as to lead to the formation of tribasic phosphate of soda, at the expense of the phosphorus they contain.

No exact quantitative analyses were attempted by the author, the comparative experiments having been performed on small portions only of serum (from 25 to 40 grains); sufficiently large, however, to furnish satisfactory evidence of the actual presence of the phosphate in arterial blood, and also in those portions of venous blood which had been arterialized out of the body; while no such indications were obtained from similar portions of the blood contained in the veins.

At the conclusion of the paper, the author notices the experiments of Enderlin, in which no alkaline carbonate could be detected in the ashes of blood; and shows that this is the natural consequence of the phosphates of the clot being oxidized during combustion, and thus supplying a quantity of phosphoric acid sufficient to decompose completely the alkaline carbonate produced by the incineration of the lactate and albuminate of the serum. Most specimens of serum, even as obtained from arterial blood, yield an alkaline carbonate when incinerated; and this is always the case with the serum of venous blood. The author, therefore, thinks himself warranted in regarding the conclusion founded on Enderlin's experiments, that the blood contains no lactate, as being erroneous.

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3. *On the entrance of Insoluble Substances from the Intestinal Canal into the Blood-Vessels.* By Prof. Oesterlen.—In some recent experiments Prof. Oesterlen administered, for five or six days in succession, to five rabbits, a cat, and two young fowls, a certain quantity of wood-charcoal in their food. The charcoal was reduced to the finest possible powder, and was rubbed up with water. About an ounce from first to last was taken by the rabbits; rather less by the other animals. Oesterlen preferred charcoal for his experiments, owing to there being no doubt about the complete insolubility in the intestinal canal, and owing to the circumstance of the smallest particles of this substance being distinguishable by their deep and uniform colour, and by their peculiar forms; the points and edges on their surface preventing their being mistaken for particles of pigment. In all the experiments, the excrements voided from the animals were coloured black.

After administering the charcoal for five or six days, the animals were severally strangled, and the blood of each was examined. One of the mesenteric veins was in the first place opened, and a drop of blood removed therefrom on to a slip of glass, carefully cleaned from all trace of dust and charcoal, and then examined beneath the microscope. In such cases, it was noticed that in a portion of the blood, extending over not more than half a line of surface, there were from three to six particles of charcoal, which were in all respects similar to those of the charcoal administered. The smallest and most abundant of these particles were not more than from 1-300th to 1-200th of a line in diameter; others, however, and by no means a few, were from 1-30th to 1-100th of a line in length, by 1-180th to 1-150th in breadth; whilst others, again, appeared so large, that it is a matter of wonder how they could have made their way into the blood through epithelium, mucous membrane, and the walls of the blood-vessels. For example, some were 1-60th, 1-42d, and even more, of a line in length, and almost equally as broad. Many appeared as blocks, with ragged edges, or with teeth, spines, or tail-like processes projecting from them; others were distinctly triangular: and in many the pores were clearly discernible, so that the particles of charcoal could not be mistaken for pigment cells. Similar particles were also found in tolerably abundant quantity in blood from the trunk of the portal vein; also in the blood-coagula of the right side of the heart, in the liver, the lungs, the spleen, more scantily in the kidneys, and lastly in the inferior cava. In the cat, the contents of the thoracic duct were examined, but no trace of charcoal was found therein; the quantity found in the blood, and in the several organs of this animal, was also much smaller than in the rabbits and fowls. None of the charcoal could with certainty be recognized in either the urine or the bile; no alteration could be detected on the mucous surface of the stomach, or intestinal canal, or in any of the other organs or blood-vessels: the whole intestinal mucous surface had of course a blackish-gray colour.

That other insoluble substances besides charcoal can be absorbed into the blood, was shown by experiments on two rabbits and a young fowl, to whom recently-precipitated Prussian blue was administered with their food. The excrements were coloured blue; and after death there were found in the blood of the mesenteric veins, of the portal vein, as also in different organs of the body, a considerable quantity of roundish dark particles, which exactly resembled those of Prussian blue, and around the margins of which, when highly magnified, a bluish lustre appeared. Neither Prussian blue, however, nor cinnabar, nor any other red or yellow substance, is so well suited for these experiments as charcoal, since their molecules do not possess such a characteristic form as those of charcoal do, and their peculiar colour becomes manifest only when many of them are heaped together.

The general conclusion which must be derived from the results of the above experiments seems to be that, contrary to the prevailing opinion, solid insoluble substances may be taken up from the intestinal canal into the blood-vessels.—*Lond. Med. Gaz.*, July, from *Heller's Archives*, Bd. iv. heft 1.

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4. *Researches on the Nervous System.*—M. C. Robin communicated to the French Academy of Sciences, 21st, June last, some researches on the two orders of elementary nerve tubes, and the two orders of ganglionary globules which correspond to them. The object of these researches is to demonstrate that the ganglions of the spinal nerves and of the great sympathetic do not give origin to elementary nerve-tubes, as many modern anatomists admit,—as Valentin, Remak, Bidder, and Volkmann, &c.,—but that all nerve-tubes arise exclusively from the spinal cord and encephalon; consequently, that one can only regard these ganglions as special little nervous centres, performing, with respect to certain functions, the same office as does the cerebro-spinal axis for the other functions. These reflections naturally occur to the mind, when one sees the cavity of the tubes, or elementary nerve-fibres, given off from the spinal cord, or from the encephalon, merge into the cavity of the cells of the ganglion—(ganglionary globules,) at one of their poles, to reappear at the opposite pole of the cell, in the same manner as they entered.

Setting out from a cell, (globule,) these nerve-tubes proceed to lose themselves in the organs. Thus those peculiar cells, the agglomeration of which constitutes nervous ganglions, are no other than organs which are interposed between the origin of the nervous tube and its termination at a determinate point of its course; and perhaps there is not more than one on each tube: they arrest it in its course, but allow it once again to re-appear; they change it, they modify its structure at a point, to immediately restore it again.

Authors who have written on this matter have, hitherto, not observed the entrance and exit of each elementary tube at the two opposite poles of each globule, but only one or the other. Hence they have formed the opinion, that each of these cells of ganglions is a little nervous centre of origin for each tube.

There is yet a more important fact overlooked by others. But one kind of cells has been described, although there are two, the one kind differing from the other in numerous characters, deducible from the consideration of form, volume, contents, walls, &c. One of these two kinds of globules is always in connection with the elementary nerve-tubes of animal life, or the large tubes; the other is specially associated with the elementary tubes of organic life, or the sympathetic and their tubes. This mutual relation is constant, and this confirms the opinion of their being the two orders of elementary nerve-tubes, just named.

The two orders of globules, and their corresponding tubes, exist in the ganglions of the posterior or sensitive roots of the spinal nerves; but the globules do not exist in the anterior or motor roots.

They also exist in the ganglions of the encephalic nerves, and in those of the sympathetic; only in the latter there is a much greater number of globules and of delicate tubes than of globules and large tubes—about thirty or fifty to one, more or less, according to the ganglions. In the ganglions of the spinal marrow, on the other hand, there are about four or five globules and large tubes to one of the other description.

These facts contribute to confirm the observations of anatomists, who have pointed out the existence of two orders of elementary tubes in the nerves of animal life and in those of the sympathetic: but the large tubes predominating in the former, the thin ones in the latter.

The absence of ganglionary globules on the anterior or motor roots of spinal nerves anatomically distinguishes the elementary tubes of motor nerves of animal life from those of sensitive nerves. But this decisive character can be remarked only so far as where the anterior and posterior roots unite. If, to push the theory further, we were asked what functions we would attribute to the cells of the ganglia, we should answer that they are the modifiers of the action which goes on in the sensitive and in the organic nerves; but that it is impossible to form an idea of the nature of such modification.

Since the ganglia of the sympathetic and of the cerebro-spinal nerves enclose the same sorts of ganglionary globules, and the same elementary tubes, but only in different proportions, we see that we cannot, with Reil and Bichat, &c., conceive two independent nervous systems. This opinion is founded on the communications of the great sympathetic with the spinal nerves; on the fact that the sympathetic exclusively furnishes the nerves of the diaphragm of birds; on the partial and successive substitution of sympathetic nerves for spinal and encephalic in a great many vertebrata.

ORGANIC CHEMISTRY.

5. *Nature of the Colouring Matter of the Bile.* By M. Blondlot.—Tiedemann and Gmelin, as well as most modern chemists, consider that the colouring matter of the bile, as also all other colouring matters of organic origin, present tints which increase or diminish in depth according as they contain more or less oxygen; and that the transition from yellow to red, green, blue, and violet, which the colouring matter of the bile manifests under the influence of certain reagents, is due essentially to oxidation. It seems more probable, however, that carbon, and not oxygen, is the substance which must be regarded as the principal agent concerned in the production of colour in these organic matters. For example, it is well known that, when concentrated sulphuric acid is placed in contact with almost any organic substance, it destroys such substance, and, at the same time, acquires a more or less black colour. This circumstance depends, without any doubt, on the great affinity of sulphuric acid for water, the formation of which it determines at the expense of the oxygen and hydrogen of the organic matter; so that the carbon, being rendered more and more predominant, finally appears with its characteristic black colour. Now, if one examines with attention the phenomena which are manifested in this simple experiment, it will be readily perceived that the colour becomes black only by degrees, and after having passed through different shades of yellow, red, brown, and violet. It is indeed true that these various tints are not well marked, and appear to be confounded one with the other; nevertheless, there are some substances which, treated thus with sulphuric acid, produce much more strongly marked colours: such, for example, are the resinous substances, and especially the biliary resin. If a small quantity of this substance be placed in concentrated sulphuric acid, it will be observed, during its decomposition, to present a series of distinct and well-marked colours. The liquid becomes at first yellow, then orange, red, lilac, green, blue, or violet, and, lastly, black. Now it is evident that in this case the colouring matter has acquired a tint the depth of which has increased in proportion as the carbon became more predominant. And analogy leads to the conclusion that a similar view may be held in regard to other colouring matters of organic origin. The colouring matter of the bile, therefore, is deeper according as it is richer in carbon; and, in cases where the colour is very dark, the colouring matter appears to consist almost entirely of carbon. This is well shown also in the fact pointed out by Berzelius, that there exists one kind of biliary calculus which appears to be principally composed of carbon.—*Essai sur les fonctions du foie.*